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A REVIEW OF THE BEHAVIORAL TECHNIQUES FOR
WEIGHT REDUCTION AND CONTROL IN ADULTS

BY

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RESEARCH PAPER

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1978

Obesity has been an increasing health problem in the United States. In recent years, extensive research has been published on the use of behavioral techniques for weight control. Although traditional methods of treatment have not proven to be long-term, some behavioral studies have indicated maintenance. Findings indicate that self-control methods are most effective when they are presented through therapist instruction, which is gradually faded. A full behavioral program for weight control would also include basic adjunct procedures, i.e., monitoring of calories or food, exercise, stimulus control, and social reinforcement, as well as major behavioral methods such as covert sensitization, contracting, bibliotherapy, and aversive conditioning. Significant, positive results are possible through a behavioral program; and maintenance also has a higher probability.

Acknowledgement

I would like to thank my husband, Ron, who helped me more than he will ever know.

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Obesity has been labelled as one of the most widespread health problems in the United States, and the problem appears to be increasing. It has been estimated that more than 25% of the adult population is overweight (Sansweet, 1975). Poor health and a reduced life span can be attributed to obesity (Stunkard & Mahoney, 1976). Psychologically, social and sexual adjustments can also be detrimentally affected (Gambrill, 1977). Because obesity is currently an important problem, it will be helpful to examine some of the related causes and aspects associated with it.

Obesity occurs when the body contains too much fat; however, there is uncertainty about the specific etiology of the condition. A number of factors can play a role in obesity, among them, genetic, metabolic, and physiologic components are possible. Some research has suggested that psychological and behaviorally learned factors can affect eating behaviors. For example, obese subjects in one study were more sensitive to environmental cues for eating than were normal weight subjects (Leon & Roth, 1977). Obese subjects were shown to eat more in response to emotional stimuli than normal weight individuals in a study by Schachter, Rodin, Herman, and Conrad (cited in Stuart & Davis, 1972). The actual process of eating, such as speed and chewing rates, has been shown to differ for obese subjects who eat faster and chew less than normal weight individuals (Gaul, Craighead, & Mahoney, 1975). Although many different causes may be

responsible or contributing to obesity, a total understanding of this aspect is not necessary for treatment and control. Much research has been conducted in the area of obesity, and an ever increasing storehouse of knowledge is adding to a more thorough understanding.

Many problems face researchers who investigate the treatment of obesity. One of these is measurement. A common method of determining an overweight condition in subjects has been the use of the Metropolitan Life Insurance Company's Height and Weight Chart. Another widely used method has been approximated percentage of overweight as compared to ideal weight. One method is called skinfold measurement whereby the skin is pinched by either the fingers or calipers to estimate amount of fat (Franzini & Grimes, 1976). Some other measurement techniques are mere physical appearance and medical doctors' recommendations.

In the research, there is also a problem with outcome assessment. Some studies may present results in percentages lost while others may state pounds lost as individual amounts or group averages. It sometimes becomes difficult to compare the outcomes from one study to the next. Another aspect of this problem is initial weight of the subjects as compared to amount lost. A loss of twenty pounds in a 150-pound individual is 13% of the original body weight while the same loss of 20 pounds in a 300-pound person is only 6.7% of the original weight. Still another concern is that there can be great variability in individual losses which are not apparent in the group averages given. The weight losses between groups of subjects may be

significantly different, yet these losses may be only a few pounds. The loss of four pounds from a 200-pound person may not be noticeable.

The type of subject used may vary from study to study. Some researchers have used only females, some have used older, chronically obese individuals, and some have used students. The different populations used across studies are difficult to compare, and the generalization of results to the public may be questionable.

In much of the literature, the use of follow-up data has been variable from study to study. Many reports have either not included follow-up data or have used such brief follow-ups that long-range effectiveness of treatment has been unclear. Thus, while studies might be compared in terms of initial weight loss, the important issue of maintenance cannot be adequately assessed.

In some of the research, another difficulty sometimes apparent is inadequate controls. When controls are not included at all, it can be even more difficult to assess causal relationships. Many researchers have encountered difficulties with uncontrolled variables. Isolating the exact techniques to be used in experiments is not often accomplished. For example, a study may be concerned with a comparison of self-reinforcement and self-punishment. However, if the subjects have any contact with the therapist or group members, another variable may be having an effect upon the results of the experiment. This type of unknown variable effect is present in much of the research on obesity.

One of the most disheartening aspects in the treatment of obesity has been the high recidivism rate. As Dr. Albert Stunkard (cited in

Sansweet, 1975, p. 124), published authority on obesity, has noted: "Most obese persons will not remain in treatment. Of those who remain in treatment, most will not lose weight; and of those who lose weight, most will regain it." Certainly, any review of weight control techniques must attend to these concerns. There are several aspects of this particular problem that may be examined. Follow-up studies, which were discussed earlier, may eventually add knowledge to long-range effectiveness. The development of tests which predict success probabilities for different subjects would also help to increase maintenance rates. There is also the possibility that certain techniques are more successful with specific types of subjects. There are a number of problems in the area of relapse and maintenance to be resolved by future research. They must also be considered in comparisons and evaluations of studies. Before reviewing and assessing the behavioral literature on weight control, it may be helpful to take a look at traditional methods and perhaps understand better the reason for using behavioral methods.

Leon (1977) reviewed some of the major traditional techniques for weight reduction and compared their efficacy to that of the basic behavioral approach. She divided the methods into five basic categories: dieting, fasting, drug therapy, intestinal by-pass surgery, and behavioral methods. Dieting is usually concerned with a reduction of caloric intake. In controlled environments, this method has been somewhat successful; however, generalization to the normal environment and long-range maintenance have not proven to be successful.

The second technique, fasting, has some positive and negative aspects. After the first few days, hunger is not usually experienced. Some serious side effects have been noted, though, including heart failure, physical stress, and hypotension. Drug therapy is another traditional method for the treatment of obesity. This method has resulted in negligible long-term effects as well as some dangerous side effects such as drug addiction and mood change. The fourth method noted in Leon's research was intestinal by-pass surgery in which a part of the small intestine is removed to reduce absorption. Although this method can result in massive and permanent weight losses, the side effects have been particularly troublesome. Mortality, liver damage, and severe diarrhea have resulted. It has been limited to extreme cases, and its use even then is debatable. Lastly, behavioral methods have been studied in the past decade as a means of treating obesity. Many significant losses as well as follow-up data have indicated the most promise for this method.

It will be helpful at this point to discuss the major difference between the traditional approaches and behavioral approaches and to define the rationale for the behavioral approach. As has been noted, the traditional methods have tried to change body weight through manipulation of calories, drugs, or surgery. Even if dieting or drugs cause weight losses, there will probably be a return to old, established habits after treatment ends. Behavioral approaches attempt to focus on a gradual change through a learning process. The basic premise is that a long-term change is possible when an individual

modifies his habits. This is accomplished through a variety of techniques which are aimed at controlling the environment and the related events which affect eating habits. First the problematic behavior is thought to be controlled basically by antecedent and consequent events. One of the main goals, therefore, would be to manipulate these events to change the outcome favorably. If an individual can learn the methods necessary for change, maintenance of the new process could be controlled by that individual or reinstated when desired. The extent to which ultimate self-control can be established and the role of the therapist in this process are important issues in an evaluation of the behavioral approach.

Having briefly stated the general rationale for the behavioral methods, the more specific behavioral techniques will now be reviewed.

There are a number of significant clinical issues that will be evaluated as a result of the literature review: which technique or combination of techniques are most effective, treatment length, the role of the therapist in treatment, and the role of self-control. Since many different behavioral techniques have been applied in weight reduction studies, each of these treatments must be assessed in terms of positive, long-lasting effects. Treatment length may be determined in part by an evaluation of follow-up data and positive results. The role of the therapist in treatment needs to be defined. By evaluating the research for therapist effect, it may be determined to what extent a therapist's role applies. The role of self-control is important because a major emphasis in weight reduction is

that of learning to follow procedures and enforcement of the techniques by the individual. Whether or not a therapist manages a weight control program, the individuals involved must incorporate procedures, follow instructions, and be willing to take responsibility for the program eventually. After the research has been reviewed and evaluated, conclusions and recommendations may be presented concerning these clinical issues involved in the treatment of obesity.

Behavioral and Non-behavioral adjunct procedures

The literature can be organized into basic treatment types for easier review: (1) basic behavioral and non-behavioral adjunct procedures which are commonly found from study to study, (2) aversive conditioning, (3) covert sensitization, (4) covert conditioning, (5) therapist control or management, (6) self-control or management, (7) bibliotherapy, (8) contracting, and (9) combined or full behavioral treatment programs.

Basic behavioral and non-behavioral adjunct procedures

The adjunct procedures in this section are usually not used as sole treatments, but they are found in numerous studies as additional aids in treatment. An important aspect of behavioral programs is stimulus control. Control is sought over antecedent and consequent events which can affect the rate of response. Antecedents can help to cue the individual to respond with certain behaviors. In the eating response, for example, the aroma or sight of food could cue a person to eat. A consequent event could be the

sight of a clean plate or a statement of approval from someone. By gaining control of such events, the rate of responding can be affected. Stuart and Davis (1972) cited several studies which indicated that obese subjects are more influenced by environmental cues than are normal weight subjects. If antecedents and consequences can be controlled, weight reduction and maintenance can become more internalized because conditioned external cues can come under control. To minimize the times when eating would occur, strict controls can be used. Several aspects of the eating response have been applied, such as times of day, specific foods, and certain procedures which become cues (Ferster, Nurnberger, & Levitt, 1962). Stimulus control is found across studies and may be used as a part of a weight control program.

Chaining is another procedure used in many behavioral studies. A chain is a number of responses in a sequence. As a chain becomes longer, it becomes weaker; and the end response may be reduced or eliminated. Some studies have found that this technique may help to reduce the amount of food consumed. Ferster, et al (1962), introduced this procedure as part of a treatment plan. Subjects are instructed to eat slowly, replace utensils between bites, and to prepare one serving at a time. These steps can help to weaken the eating chain, and reduce the amount of food eaten. By lengthening the amount of time to eat, it also allows normal biological cues of hunger reduction to generate (Stuart & Davis, 1972).

Self-monitoring has also been used as a part of many studies on weight reduction. Basically, the technique may be used before or

after eating. Usually, calories or amounts of food are recorded and may also be graphed. This procedure can be useful in a number of ways. It can reveal information previously unknown to subjects about their actual intake of foods, and it can also identify problem situations and behavior which influence food intake. In one piece of research (Bellack, Rozensky, & Schwartz, 1974), pre- and post-monitoring were compared to each other and a control group. While the post monitoring group and the controls lost no weight, every subject in the premonitoring group achieved weight loss. A later study (Blitch, 1974) compared post monitoring of foods eaten in one group to two control groups, which were study-time monitoring and nutritional training. Groups of students were used in this study. No differences were found in weight lost between groups. Romanczyk (1974) found that the self-monitoring of daily weight had no effect on weight loss, while the monitoring of daily caloric intake was effective in producing weight loss. No follow-up data was presented in this study. A later study (Fisher, Green, Friedling, Levenkron, & Porter, 1976) examined a weight monitoring technique whereby daily weight was graphed on a chart. Little supervision was reported, and a weight loss was obtained. No follow-up information was included in these studies so that maintenance of the loss is unknown. Research has not substantiated self-monitoring as a sole technique for weight reduction. Although some weight losses have occurred, follow-up data and control groups have generally been lacking. There is some evidence which indicates that pre-monitoring has more

of a significant effect on weight loss than post-monitoring and that caloric monitoring has more significant effect than weight monitoring.

Another method that has been suggested for weight loss programs is cognitive restructuring. Mahoney and Mahoney (1976) discussed its use in their book Permanent Weight Control. They contend that thoughts influence behavior and feelings. Negative self statements can cause an overall pessimism which in turn is not conducive to changing or setting goals. If a person said to himself, "I'm fat and I can't change," he may be defeated before he begins. When the negative statements are altered, the person has a much better chance of gaining further control over emotions and behaviors as well. Positive thinking may help to stabilize the emotions, and an individual can then choose the actions that are desired. Another factor in the thought changing process is realism. Too often, people set high goals that could never be attained; and then the negative self statements return. If goals are kept reasonably within range, a more positive outlook is possible; and the cognitive statements can remain optimistic. Another aspect of behavioral theory is implied. If the goals are realistic and set in steps, the individual is positively reinforced every time success is achieved. When the accompanying thoughts are also positive, the chances are greater that the behavior will increase.

Social reinforcement is another variable that has some importance in weight control treatments. Desirable behaviors can be in-

creased if they are positively reinforced by significant others in the environment. This was illustrated by a recent study (Matson, 1977) which compared social reinforcement to self-monitoring and stimulus control. For the first part of the treatment of an obese woman, environmental changes and monitoring occurred. The next part of the treatment added reinforcement and punishment (both verbal) from the subject's husband. Although the first section of the treatment had little effect, the second stage showed a 39 pound loss. This maintenance was continued and increased over a 90 week follow-up. Even though this study did not include a number of subjects or controls, it did include a very long follow-up period and a large weight loss. From evidence of group and therapist effect over a number of studies, the influence of social reinforcement is an important factor in weight reduction.

Exercise and nutritional counseling, though non-behavioral methods, are often incorporated as part of a behavioral program. They are not usually used as sole treatments for obesity but are sometimes included as part of a treatment program.

Another method helpful in weight loss programs is exercise. A multitude of research studies have incorporated exercise as part of the reducing program. Since obesity is usually caused by a greater caloric intake than output, one aspect of weight reduction would be to increase caloric expenditure. By moderately decreasing food intake while increasing activity, the most positive long-range effects can occur. A pleasant aspect of exercise is that food intake usually

decreases somewhat when the amount of exercise is increased (Stuart & Davis, 1976).

Nutritional counseling is another procedure that has been used in many behavioral programs. Information given usually covers the daily requirements for a balanced diet, basic food group information, and the caloric contents of foods. The use of nutritional information can be used in the natural environment unlike diets which require special foods and may not generalize for long-term maintenance (Gambrill, 1977). By emphasis on good nutrition, clients are also less likely to suffer health problems; and this could help to lower the dropout rate.

The methods that have been described are often included in behavioral programs because they can add to positive results. They have been most frequently applied in full weight reduction programs as adjuncts to the behavioral techniques. At this point, a review of the various specific treatment techniques of the behavioral approach and the accompanying literature will aid in determining necessary and relevant factors for weight control.

Aversive conditioning

Aversive conditioning has been used in a number of behavioral studies on weight reduction. Usually the method involves the pairing of desirable foods with a noxious substance, so that the foods gradually lose their positive value. Such aversive stimuli as noxious odors and cigarette smoke have been paired with problem foods.

One of the earliest studies was attempted by Moss (cited by

Abramson, 1973) in 1924. He paired a loud noise with vinegar drinking and then paired the noise with orange juice drinking. The subject would refuse the orange juice. This was a classical conditioning experiment which did not report generalization. The basic procedure, however, can be viewed as an historical predecessor of aversive conditioning.

In a later experiment, Forety and Kennedy (1971) paired the favorite foods of six obese subjects with noxious odors. The foods were heated in front of the subjects, and they were told to think about eating them. Then the subjects were to smell a noxious odor from an oxygen mask. Over a nine-week conditioning period, the subjects averaged a 13-pound loss. Six control subjects averaged a one-pound loss. At a 48-week follow-up, experimental subjects averaged a 9-pound maintenance loss, and the controls averaged a one pound gain. The authors indicated that this method could be used as a part of weight reduction programs. Although the authors regarded their experiment as aversive conditioning, they incorporated the imagining of eating the foods. This procedure was described in a study by Ashem, Poser, & Trudell (1972) as overt aversive sensitization. This study will be reviewed under the section on covert sensitization. From this research, the authors also noted that the experimenter-patient relationship was important. They indicated that the rapport between the therapist and subjects was necessary for very positive outcome.

Cigarette smoke was used in a study (Morganstern, 1974) as an aversive conditioning agent to treat a 180-pound female student.

The treatment lasted for 18 weekly sessions. The subject would take a bite of a problem food, candy, cookies, or doughnuts, chew, and then take a drag of smoke from the cigarette. She was then to spit out the food, saying, "Eating this junk makes me sick!" This procedure was repeated 10 times per session and twice per day at home. By week 16, consumption of the problem foods had fallen to 0, and treatment termination occurred on week 18, at which time the subject had lost 41 pounds. At a 6 week follow-up, the subject had reported 12 additional pounds lost. In this study, the follow-up period was short, there was only one subject and no controls. Again, the therapist effect on results is unmeasurable.

The therapist has almost total control in this procedure except for homework assignments, which are self-controlled. Generalization to overall eating habits is not usually indicated. There have not been enough studies on this method or enough use of controls to form definite conclusions. It has been suggested as a supplement to other programs rather than as a full-treatment strategy.

Covert sensitization

Aversive conditioning procedures consisted of the negative pairing of desirable foods with aversive stimuli foods and situations as well as the noxious events which follow. If imagined stimuli are pleasant, they are called covert reinforcement or positive covert sensitization; and if the imagined stimuli are disagreeable, they are called covert punishment or negative covert sensitization.

Cautela described the technique in an article published in 1967. Although he cited some previous research. Cautela did not present any original data in his article. He described the technique as a method of punishing unwanted responses and reinforcing responses to replace eating. Subjects were told to imagine themselves approaching a problem food and then to imagine themselves nausea and vomiting. Later, they added leaving the scene of the food and nausea and consequently feeling relief. This process may be viewed as a combination of covert punishment and covert negative reinforcement.

In a later study (Manno & Marston, 1972), negative and positive covert sensitization were compared to each other and to a control group. At a three month follow-up, these two treatments differed significantly in weight lost as compared to the no treatment control group. They did not differ significantly from each other. Other researchers (Ashem, Poser, & Trudell, 1972) treated a 400-pound male and a 300-pound female with what was termed covert sensitization (imagined approach to food paired with imagined aversive consequence) and overt aversive sensitization (imagined approach to food stimulus paired with actual noxious odor). The male subject received the covert treatment paired with the overt type. He regained most of the weight that had been lost during treatment once treatment ended. The female subject received covert treatment and then after several weeks received both covert and overt treatment combined. She showed a steady loss over time, which included a 40 week follow-up. This study did not control for possible sex differences or a no treatment factor.

As has been noted in other studies, the therapist effect cannot be determined. This procedure has usually been reported in single subject designs, and it may be possible that experimenter reinforcement has a positive effect.

When negative, positive, and avoidance covert sensitization were applied to three groups (Rochios, 1976), the experimental groups had significantly greater weight losses than three control groups (dietary, non-treatment, and psychotherapy). At a 6 week follow-up, the avoidance and positive groups had maintained their losses, but the negative group was not significantly different from the controls. This study used groups rather than case studies, and it included three control groups. The follow-up period was rather short. In another piece of research that used groups (Elliott & Denney, 1975), covert sensitization was not found to be any more effective than an attention-placebo control group. Although the procedure was found to reduce the craving for specific foods which were treated, generalization to other foods or overall intake was not found. One possibility for the difference in the findings cited is the strong therapist reinforcement that exists in the one-to-one studies. When the group situations are examined, there could be less effect. One way to examine this would be to control for therapist effect by using a no-contact group. This could be accomplished in one of several ways, for example a written manual on the procedure or reducing the number of contact sessions. Covert sensitization utilizes initial therapist control because the therapist instructs the learning of the

technique closely. However, as the subject gradually practices the method and uses it for weight reduction, it becomes a self-control technique. Thus far concrete decisions on the efficacy of covert sensitization cannot be reached due to a number of methodological problems previously discussed.

Coverant conditioning

This approach is based on the Premack Principle, which indicates that a low occurring event can be increased if a highly occurring event becomes contingent upon completion of the low occurring event. It can be used in weight reduction as highly positive behaviors can be substituted for non-eating, a less highly-occurring event, and positive statements or negative statements can also affect the occurrence.

Tyler and Straughan (1970) compared coverant control to breath holding as a treatment for obesity. The coverant group was to self-reinforce with positive statements when they followed their dieting plan and to omit reinforcing statements otherwise. A control group was also used in this study (no-treatment). No significant differences were noted between the three groups, and weight losses were less than a one pound average for a two month period. A second study (Horan & Johnson, 1971) compared a delayed treatment control group, an information, nutritional group, and two coverant conditioning groups. One group was to use activities incompatible with eating and the other group was to self-reinforce or punish by saying statements each day to themselves, accordingly. Although there was

a significant difference in weight loss of the experimental groups as compared to the control groups, no difference could be found between the coverant and information groups. In this study, weight loss only averaged 5 pounds; and there was no follow-up. Horan, Baker, Hoffman, and Shute (1975) found positive coverants to be significantly more effective for weight loss than either a control group or negative coverant procedures. When positive coverant techniques were combined with group counseling and dietary information, greater positive results were reported. In this study, it is not easily determined to what extent coverant conditioning is effective as a treatment itself. The literature on this method is not conclusive as to effectiveness or long-range maintenance. More research could help to isolate its effect in treatment and to determine the outcome of a combined approach in which other types of treatments are added.

Therapist control or management

Another of the behavioral techniques which has been examined in the literature is the control of the weight program by the therapist. Some of the literature pertaining to therapist control was conducted on a behavioral psychiatric ward by Bernard (1968). A 407 pound schizophrenic female patient was placed on a diet and was paid 10 tokens for each pound lost and received verbal reinforcement. A total of 102 pounds was lost during a 6 month treatment plan. A similar study was carried out using two obese patients of a psychiatric token economy ward (Upper & Newton, 1971). Weight losses

of 63 and 31 pounds were reported. Although these studies achieved positive results, generalized conclusions for the normal population must be reserved. Obtaining such full control of the environment in a non-hospital setting would be improbable. It was also noted that large numbers of subjects, control groups, and long follow-ups were lacking. Therapist control appeared to be positive.

Hall (1972) compared self-control to therapist control using two groups. Condition I received self-control information including stimulus control, chaining, substituting reinforcing activities for eating, punishing the desire for food with aversive words, and reinforcing verbally for declining food. This was for a 5 week period. For the following 5 weeks, experimenter control was instated. This consisted of each subject choosing an item for under \$20, which was put on lay away, and could be received by the loss of one pound per week. Weekly weigh-ins told how much weight was yet to be lost and how much time. Condition II received the same treatments but in reverse order. Although the self-control conditions acquired a weight loss, the therapist control condition acquired a more substantial loss. Follow-ups at weeks 27 and 30, no changes were reported from the initial losses. This study did not include a no-treatment control group, but the reverse treatment design was helpful because it illustrated the effects of therapist control as compared to self-control.

A later examination of external versus self-control found similar results (Bellack, Schwartz, & Rozensky, 1974). A self-control

group received instructions on self-monitoring and mailed records weekly. The external contact group met weekly with the therapist and received social reinforcement. Both groups received diet information during the initial contact. A control group had no contact at all. In the external contact group, every subject lost weight. This was not true of the self-control group, although no significant differences were reported between mean weight loss of these two groups. The control group had no changes in weight. No follow-up data were available.

In a comparison of a live to a videotaped therapist (Becker, 1975), subjects saw either the therapist in person or a color videotape of the same therapist presenting the same course instructions that were presented in vivo. Subjects were judged to be at least 10% overweight and chosen from the community. No differences in weight loss were observed between the group which received live presentations of material and the group which saw the taped presentations. Both procedures were reported to have achieved more significant weight losses than a no-treatment telephone contact group or a no-treatment control group. The mean number of pounds lost after a ten week follow-up for the two treatment groups were 12.6 (live) and 11.3 (video). These groups had achieved initial losses of 10.6 and 7 pounds respectively during the first 8 weeks. During the follow-up period, both groups reported weights monthly by mail. This was not a no-contact follow-up. Both the live therapist and the videotaped therapist groups had therapist contact in the form of instructions. It was not clear

how strictly the situation was controlled to insure that both groups received the same presentation. Certainly more research is indicated on the use of videotaped therapists for weight control programs.

In another study (Lindstrom, Balch, & Reese, 1976) that looked at the role of the therapist, treatment groups were led by pre-professionals, para-professionals, or received telephone contact, or no-treatment. Significant weight losses were reported for all treatment groups as compared to controls. No between group differences were found, however, for the in-person contact versus the telephone contact groups. No follow-up data was reported in this study, so the long-term differences are unknown.

An interesting study (Carter & Rice & DeJulio, 1977), compared therapist fade out to no fade out over a ten week treatment program which presented behavioral weight control information at each meeting. The fade group met every two or three weeks over a ten week period (4 meetings in all). The no fade group met once per week for ten weeks. A punishment group was to say "No," and walk to a neutral area to control eating; and a reinforcement group used coverant control and redeemable self rewarded points for control of eating. All groups were required to deposit \$40., \$15. to be returned after 10 weeks, and \$25. returned after a mailed questionnaire was received 6 months after treatment ended. The punishment and reinforcement groups did not change weight significantly. The fade group lost significantly more weight after 10 weeks than the no fade, and their losses were maintained over a 6 month no contact follow-up. Although a no-

treatment group was not included, a rather long follow-up period showed that maintenance did occur. This study indicated that therapist control can gradually fade, and self-control can gradually increase to significant long-term maintenance.

The importance of therapist reinforcement was emphasized by Kingsley and Wilson (1977). They suggested that self-help manuals and self-control procedures were successful primarily for short term effect. Therapist attention, booster sessions, and individual treatment were indicated for positive long-range results. Their article was a review of the long-range results of behavioral treatments for obesity. From studying the research that is available on therapist control or management, it seems that most studies have found it to be an effective tool for a weight reduction program.

Self-control or management

It is difficult to isolate self-control as a treatment technique because of possible therapist effect. However, a number of studies have either sought to examine self-control as a procedure or to acknowledge the role of other treatments in its use. (Several studies, i.e., Kelly & Curran, 1976, and Winter, 1975, have already been cited in this regard). It is still useful to consider the literature on self-control in order to obtain a clearer picture of its effect on weight reduction.

The basic premise of this procedure is to teach subjects the ways that they can control eating particularly through changing the environment. Other procedures are self-monitoring, self-reinforce-

ment, and self-punishment. These are often used as adjuncts to self-control procedures. Stuart (1972) outlined some of the important steps in the self-control process: (1) definition of the goal and use of the Premack Principle, (2) self-monitoring, (3) identification of antecedents and consequences, (4) stimulus control procedures, and (5) feedback from others. Other researchers (Marston and Feldman, 1972) have suggested the learning of self-control as a two-stage process. First, they suggested that cognitive ideas can be changed to help control the problem behavior. Secondly, certain controlling behaviors may add to the change, providing positive reinforcement.

There have been a number of articles examining self-reinforcement or control in the literature. One of the earliest was a study by Stuart (1967) in which he defined self-control as the major technique in his experiment. Subjects were 8 patients who had been judged as obese by their physicians. He used many of the basic behavioral and non-behavioral procedures previously discussed in this paper.

Treatment sessions were 3 times per week for the first month and thereafter, every 2 weeks for the following 12 weeks. Maintenance (booster) sessions were scheduled as needed. Subjects lost a significant amount of weight which was maintained over a 12 month follow-up. Although this study was concerned primarily with self-control as a treatment technique, the author acknowledged that an unspecified therapist effect was present in the study. Positive praise and contact over treatment time may have added to the success of the outcome. This study did not use a control group or other treatment group

but did use chronically obese subjects and a long term follow-up.

Harris (1969) investigated the development of self-directed techniques for weight reduction. She used university male and female subjects compared to a no-treatment control group. Basically, Harris used four main techniques: positive and negative reinforcement, stimulus control, and chaining. After 2 1/2 months, the experimental group was randomly divided into two subgroups. Group I was a continuation of the past treatment, and the Group II members received additional training in covert conditioning. After 4 months of treatment, the two experimental subgroups had reduced weight significantly more than the control group; but there was no difference between Groups I and II. Although the additional technique was not found to add to weight loss, positive results were found in this self-control study. Effects of therapist reinforcement or contact cannot be determined in this study since this variable was not controlled.

A possible hazard of weight control was illustrated in a self-control case study (Martin & Sachs, 1973) in which an obese woman received a self-control written program and signed a contract for weight loss. However, she skipped eating for two days in an attempt to obtain the required loss. The subject also took some sleeping pills and alcohol and required hospitalization, after which she terminated the program. The authors felt that close supervision is advised in this type of experimentation. Again, the role of the therapist arises as having its place in a weight reduction program. This study was termed a self-control program, but in actuality, a contract pro-

cedure involving therapist control was a major technique. Another issue which surfaces is the possibility of health hazards in dieting, and the possibility of liability if subjects are harmed by the procedures used.

Mahoney, Moura, and Wade (1973) compared some specific methods, self-reward, self-punishment, and self-monitoring. They included an information control group as well. After a 4 week treatment, the self-reward group had lost significantly more weight than either the self-monitoring or information groups, and showed a continuously growing improvement over the self-punishment group. These researchers felt that schedule and amount of self-rewards needs more research. This study used obese adults, a control group, and specific variables to be compared. No long range follow-up data were indicated.

Self-reward has been compared to self-monitoring in several studies. In one (Mahoney, 1974), obese adults received one of the following treatments in groups: self-reward for weight loss, self-reward for habit improvement, self-monitoring, or a control group. It was found that only the self-reward for improved habit group obtained significant losses through follow-up, which was 8 weeks in length. Bellack (1976) also compared self-reinforcement to self-monitoring. Three groups of subjects received information on calories, stimulus control, and monitoring of eating habits. Self-reinforcement groups achieved more weight loss during treatment and follow-up. The author suggested that some positive findings with self-monitoring may have been due to group interaction and therapist contact. Its use as part

of the stimulus control process was seen as beneficial.

Jeffrey (1974) reported positive findings with self-control procedures. He found that both self- and external-control procedures allowed for equal reductions in weight, but that for long range maintenance, self-control methods were most effective. Jeffrey felt that the self-control subjects learned to depend upon themselves rather than on someone else for behavior change. He suggested that future research include longer training sessions and follow-ups as well as investigation of therapist effect and differing aspects of self-reward.

Kelly and Curran (1976) compared a self-control program that introduced the modification of environmental cues to an emotional coping technique whereby subjects were treated for decreasing eating in response to emotions. A nutritional information group and a waiting list no treatment served as controls. At the end of 9 weeks, the self-control group had lost significantly more weight than the control groups and a higher proportion of weight than the emotion group. At a 26 week follow-up, no maintenance was found. The researchers suggested that continued therapist contact may be necessary for maintenance of self-control losses. The self-control group lost weight as long as therapist contact continued. During the no-contact period, losses were not maintained. The researchers concluded that continued therapist contact may have continued maintenance of weight losses.

Another study (Hall, Hall, Hanson, & Borden, 1974) used students and overweight subjects from the community to compare two self-management procedures and two control groups. Group I was a combined

self-management method of 75 min. weekly meeting with a therapist, weight and food monitoring, stimulus control, self-reinforcement, and self-punishment, chaining techniques, and therapist approval for losses. Group II was a simple self-managment group, which met for 10 min. per week, and monitored and recorded bites per day. After 2 weeks, the amounts of bites were to be increased or decreased so that a 1 to 2 pound loss per week could be achieved. The therapist instructed subjects on this point. Group III met weekly for relaxation training, and Group IV weighed in on the first and tenth weeks. The two behavioral groups lost a higher percentage of body weight than the two controls after 10 weeks. The combined self-control, Group I, averaged a 6.6 pound loss, and Group II, simple, averaged 5.67. At a 3 month follow-up, the behavioral groups differed in weight lost from controls but not from each other. At 6 months, there was no difference in the 4 groups. The author suggested the use of maintenance sessions to extend therapist and peer reinforcement. These two variables were not controlled for, and in fact, therapist reinforcement was a part of the combined self-control technique.

When self-reinforcement was compared to behavioral contracting (Schwartz, 1976), no difference could be found between the two; but both treatments lost significantly more weight than a control group. Rozensky and Bellack (1976) conducted a unique study on the style of self-reinforcement, low or high, and the interaction to self-controlled and therapist-controlled treatment modes. Subjects were given

a self-reinforcement test and divided into three groups. A self-control group mailed monitoring records daily and met once per week for diet information. An external control group received a manual, met once per week, mailed weight records daily, and had a deposit to be returned weekly at \$1. per pound lost not to exceed \$2. per week. A minimal contact group received information and weighed in on weeks 7 and 14. While the low self-reinforcers did fairly well in both treatments, the high self-reinforcers did very well in the self-control group and did not lose weight in the externally-controlled condition. There was maintenance over a 7 week follow-up. These researchers suggested that further study be carried out on self-reinforcement style and its effect on locus of control. Other indications were that monitoring and therapist control may have positive effects on findings.

A similar study was described by Bellack, Glanz, and Simon (1976) in which high reinforcers were compared to low self-reinforcers. A time estimation test was given to all subjects who were to give themselves a letter grade for correct estimations. Subjects were then divided into the two groups. However, self-reward and self-punishment did not interact with subject types. High self-reinforcers lost significantly more weight (1.36 pounds per week) than did the low self-reinforcers (.76 pounds per week). At a 5 month follow-up, this difference was maintained.

In research reported by Winter (1975), chronically obese women were tested for internal or external control orientation by the

Rotter I-E test and divided into 4 groups. There were self-control methods given to internal subjects, self-control methods given to external subjects, external methods to external subjects, and external control methods given to internal control subjects. Subjects who were given treatments that parallel their type of functioning lost significantly more weight than subjects who were matched to opposite procedures. It was suggested that subjects who differ in internal and external control may require different treatment approaches. In the many articles on self-managed procedures, it can be seen that positive results have been reported with its use. Despite questions concerning therapist role, self-control methods have been shown to be significantly more effective than no treatment controls. Its future use in weight reduction behavioral programs is very important. Abramson (1973) felt that the learning of skills could aid in continued maintenance. Further study into the many aspects of the dimensions could help to refine treatment plans.

Bibliotherapy

This technique incorporates the use of written manuals as the main procedure for a weight reduction program. It could be viewed as a type of self-control with remote therapist contact.

Hagen (1974) studied the effect of group therapy, a behavioral manual group, a manual and group contact, and a no treatment control. The manual only group mailed each week to the examiner homework lessons and received them back the following week with comments. The manual and contact group had a weekly weigh-in, charts, social pres-

tures, information, and the manual. The contact only group had all of the procedures of the contact and manual group, except no manual was used. Although the three treatments were significantly more effective than the control group, they did not differ from each other. At a 4 week follow-up, no changes were reported since the end of treatment. The author concluded that personal contact between group members or with the therapist was not necessary for positive change to occur. This study did not include a long-term follow-up, and did not sufficiently control for therapist effect. The no contact group received feedback from the therapist weekly in the form of graded homework which included personal comments.

Another study (Hanson, Borden, & Hall, 1976) investigated the effect of a behavioral text for teaching weight reduction skills. The manual group was compared to a high-therapist contact group, a low-therapist contact group, and an attention-placebo group, which had discussion meetings. At post treatment, as well as at a 10 week follow-up, all of the treatment groups had significantly greater weight losses than the two control groups. However, at a one year follow-up, none of the treatment groups differed from the controls.

Glasgow and Rosen (1978) conducted a review of the literature on behavioral bibliotherapy. Much of the research that they cited compared the use of manual only (for example Stuart & Davis (1972) Slim Chance in a Fat World) to therapist contact with manual use. They found fairly consistent results across much of the literature. Under entirely self-directed conditions, weight losses were insig-

nificant. When therapist contact was added, weight losses were reported. Follow-ups were reported in different studies at 6 weeks, 4 weeks, 10 weeks, 4 months, and 1 year. In one example, a 1 year follow-up showed maintenance with minimal contact. The authors concluded that bibliotherapy alone is insufficient for weight reduction and maintenance. When combined with therapist contact, however, significant results have been obtained. They suggested a need for further research containing long-range follow-ups, chronically obese subjects, and further comparisons of bibliotherapy to other behavioral techniques.

Behavioral contracting

Another of the commonly used behavioral techniques in weight studies has been contracting. It may be viewed as a form of therapist control. However, because it could conceivably be used by an individual with himself or a family member, it will be treated as a technique in itself. Usually these agreements state that an individual will not terminate a program prematurely. Often, a monetary deposit is required which sometimes is refundable after successful completion of the program.

Harris and Bruner (1971) compared contracting to a self-control program. Both procedures obtained weight losses while they were in effect. A follow-up revealed maintenance, but no additional losses, which indicated that losses were due to the behavioral treatments. It was suggested that the two methods combined might be even more effective than the use of either one or the other.

A more recent study (White, 1976) obtained a greater weight loss and lower drop-out rate in a high deposit (\$60.) group than in instructional or basic behavioral groups. No follow-up information was offered, and the variables included as basic behavioral methods were unclear. The findings for the high deposit group related that higher weight losses were obtained than in other groups. This differs from the finding of Hagen, Foreyt, and Durham (1976). They had found lower weight losses in the high deposit group.

Another study (Hagen, Foreyt, & Durham, 1976) found that a monetary deposit reduced the drop-out rate. The greater the deposit was, the higher was the percentage of subjects completing the program. Another interesting effect was noted. The no deposit group ended treatment with a higher average weight loss than the contract groups. It was theorized that subjects in the no deposit group were more likely to drop out of treatment if they could not lose weight. Low weight loss subjects in the deposit groups may have remained in treatment to collect their deposits, and so lowered the group weight loss average. This study used adults, but it did not include control groups or a long term follow-up. It did point to the use of deposit type contracts for lower attrition rates although how externally controlled continuation in a program affects outcome is unclear.

There has not been enough research yet to make definite conclusions about the efficacy of behavioral contracting as a major treatment approach for weight reduction. Some preliminary findings have concluded that it may help to lower attrition rates, but follow-up

information has not generally been included. The long-term maintenance results from this technique are currently questionable.

Combined Approaches

A number of research articles have investigated comparisons between comprehensive programs, which employ several techniques, to other types of treatment. Full behavioral programs often consist of a combination of the basic adjunct procedures such as stimulus control, self-monitoring, and exercise, and several major behavioral techniques, such as self-reinforcement, covert sensitization, contracting and bibliotherapy. For example, one study (Harris & Hallbauer, 1973) compared a full behavioral program of contracting, positive self-reinforcement, chaining, stimulus control, and aversive covert conditioning, to a full program plus exercise, and a group discussion control. At a 12 week post test, there were no significant differences as all 4 groups lost weight. At a 7 month follow-up, the treatment groups had lost significantly more than the control group. The full-treatment-plus-exercise group also averaged losing more weight than the full-treatment group, though not significantly so. This study was unusual in that the treatment groups did not report significantly greater weight losses than controls initially.

Another study (Balch and Ross, 1974) examined differences in what the authors called full and partial behavioral treatments compared to a no treatment control. The full treatment was based on the procedures in the book Slim Chance in a Fat World by Stuart and Davis (1972). Weekly meetings, assignments, charting, and verbal rein-

forcement were included. The partial treatment group received the manual and met only several times. The full treatment group lost significantly more weight than the other two groups, which did not lose weight. Maintenance of losses was reported after a 6 week follow-up (Balch & Ross, 1974). This study did use obese adults and a short-range follow-up. Although the full behavioral treatment obtained greater weight losses, various variables in the treatment were not isolated. For example, therapist effect during weekly meetings as well as verbal reinforcement are a part of this treatment.

Levitz and Stunkard (1974) conducted a comparison of behavioral techniques to a TOPS program, a TOPS program plus nutritional information, and two control groups. The behavioral program was weekly meetings in which the therapist introduced 2 or 3 behavioral techniques each week, such as recording food intake and calories, chaining, stimulus control, self-reinforcement, etc.

The TOPS program consisted of weigh-ins, rewards and punishments, weight records, and discussions. At post treatment, the behavioral program had lost significantly more weight than other groups; and at a one year follow up, maintained the loss over all other groups. The behavioral group also reported a much lower attrition rate than the other groups. The authors noted that the behavioral method was substantially more effective than the self-help group method (TOPS).

Another study (Abrahms & Allen, 1974) compared a behavioral program to social reinforcement and a no treatment control group. The behavioral techniques were superior to the social reinforcement, which

was superior to the control group. The authors suggested that a long term weight loss program include feedback, recording, reinforcement, and a gradual shift of control from therapist to family members of subjects (Abrahms & Allen, 1974). One study (Kelly, 1975) reported behavioral control methods greater than "induced affect" in which emotional eating was treated by relaxation, information, and a no-treatment control group. This study used obese women and a 26 week follow-up.

In a day hospital program for obesity, (Westlake, Levitz, & Stunkard, 1974), behavioral methods were used in conjunction with some of the additional nonbehavioral procedures such as nutritional information and meal preparation. At a follow-up of 6 months, 11 out of 14 patients maintained weight losses or increased them. Later groups in the same type of program reported mean weight losses of 24 pounds. Although this report did not include control groups, it had chronically obese subjects, moderate follow-up time, and detailed information about the treatment plan used. A similar hospital program was described by Flowers (1976) in which goals, information, exercise, and recording weight were part of the treatment plan. In still another hospital program, behavioral techniques were found to be very helpful for chronically obese patients. This study did not explore long-term effects and acknowledged the need for further research in the aspects of behavioral techniques (Mustante, 1976).

A study of Romanczyk, Tracey, Wilson, and Thorpe (1973) compared some of the basic behavioral procedures, imagery, monitoring,

contracting, relaxation training, and stimulus control, to a full treatment package which included all techniques. They found that the full-treatment method resulted in significantly greater weight losses than any of the other methods used singularly. This was maintained at an 8 week follow-up. This program was helpful in assessing the different techniques and pointed to the combination of them as being more effective for weight reduction. Another investigation of the basic behavioral methods was done by Nagy (1976). Such treatments as stimulus control, covert sensitization, the Premack principle, and a control were compared. The different treatments were found to be significantly more effective than the control group and not from each other. No follow-up information was reported in this study and it did not include the major behavioral techniques, but rather the basic procedures often used across studies.

Several researchers have attempted to suggest full treatment approaches for weight reduction and control. In a study, Stuart (1971), and Stuart & Davis (1972) in their book, Slim Chance in a Fat World, outlined a three step method, which is fairly comprehensive. It included (1) situational aspects, which would include stimulus control, antecedent and consequent control, and monitoring, (2) nutritional information and (3) exercise. This combined approach is suggested by a research study which obtained significant results. Jeffrey (1976) suggested a full program similar to the ideas of Stuart, incorporating a wide variety of approaches for treatment. In a recent book, designed for the general public, Permanent Weight Control

by Mahoney and Mahoney (1976), a wide-range approach is also suggested. Cognitive restructuring, setting reachable goals, environmental control, social reinforcement, monitoring, exercise, and relaxation are suggested as a full program for weight reduction.

Conclusions and Recommendations

Many problems were encountered in evaluating the behavioral research on weight reduction. Several researchers have investigated such difficulties as efficacy, long-term maintenance, and the assessment of obesity programs (i.e. Balch & Ross, 1975; Brightwell & Sloan, 1977; Jeffrey, Christensen, & Katz, 1975; Jeffrey, Wing, & Stunkard, 1978; Hall, 1973; Kingsley & Wilson, 1977; and O'Leary & Wilson, 1975). As predicted, many studies exhibited one or more of the following inadequacies: lack of control groups, minimal weight losses, short-term or absence of follow-up data, non-representative subject populations, or ill-defined methods and procedures. All of these inadequacies can complicate the evaluative process.

However, despite such difficulties, a number of tentative conclusions may be postulated from the existing literature. Of several initial questions posed previously in this paper, the role of self-control was an important one. Consistent findings point to several conclusions. Self-reward appeared to be more effective than the use of self-monitoring, and self-reward seemed to be particularly effective for high self-reinforcing subjects (Bellack, Glanz, & Simon, 1976; Rozensky & Bellack, 1976; and Winter, 1975). In a review of self-management, Mahoney (1973) found more significant results with the use of positive self-reward than for self-punishment methods. He also suggested that basic adjunct behavioral techniques could be

combined for the most positive results. In other words, Mahoney suggested the use of a combination of stimulus control, chaining methods, and self-monitoring. Self-control methods have been shown to be significantly more effective than no treatment controls. Obviously, for long-term maintenance, the weight reduction program must eventually be controlled by the individual. Several researchers have emphasized the importance of learning basic skills to be used during the maintenance period (Abramson, 1973 & Jeffrey, 1974). If necessary skills are ultimately under self-control, the weight reduction program could become long-term.

Many researchers who have conducted self-control studies acknowledge the confounding effect of the therapist. A number of self-control studies emphasized the importance of the therapist-client relationship (Bellack, 1976; Hall, et. al., 1974; and Stuart, 1967). Hall & Hall (1974) discussed the use of self-managed as compared to experimenter-managed conditions. They concluded that both treatments contain positive aspects. For example, a rapid weight loss is often observed during the initial phase of therapist-controlled studies. Frequently, self-control studies have obtained long-term losses. It has been suggested that a combination of the two methods could produce maximum effect (Hall & Hall, 1974; & Harris & Bruner, 1971).

Confounding therapist effect has been noted throughout all of the behavioral techniques examined in this review paper. In aversive conditioning, covert sensitization, and coverant conditioning, the

research methods were initially therapist-controlled (Ashem, et. al., 1972; & Morganstern, 1974). However, a process seems to occur in covert sensitization and coverant conditioning whereby it has been suggested that the three conditioning techniques be used conjointly with other methods until further research provides more information about their efficacy.

In bibliotherapy, a remote therapist effect has been noted because the author may direct the program. In some research, (i.e. Hagen, 1974), bibliotherapy has not been isolated for examination because the experimental group received feedback from the therapist. Contracting also usually occurs between therapist and subject. It is easily seen that the role of the therapist occurs throughout research on weight reduction. When therapist effect has been controlled, (Bellack, et. al., 1974; Glasgow & Rosen, 1978; & Mahoney, et. al., 1973), it has been found to be significantly important for positive outcome.

It has been suggested that both self-control and therapist-control should be integrated for the most positive results. Evidence suggests that therapist contact be gradually faded so that a smooth transition may occur as self-control increases (Carter, et. al., 1977; Hall, et. al., 1974; & Jeffrey, 1974). Occasional maintenance sessions may also aid in the gradual transition to total self-control (Kingsley & Wilson, 1977).

Another clinical question other than that of self- and therapist-control is treatment techniques. Many studies have compared full

treatment plans to partial treatments (Abrams & Allen, 1974; Balch & Ross, 1974; Harris & Hallbauer, 1973; Kelly, 1975; Levitz & Stunkard, 1974; Stuart & Davis, 1972; and Westlake, et. al., 1974). The full-treatment plans have usually incorporated the use of many of the following: stimulus control, chaining, self-monitoring, exercise, social reinforcement, and nutritional counseling as well as covert sensitization, contracting, bibliotherapy, self-reward, and therapist reinforcement. Long-term follow-up data has been reported from several studies using comprehensive programs (Levitz & Stunkard, 1974; & Stuart, 1971). The full-program approach has generally reported significant, positive results and has been advocated by a number of researchers such as Stuart (1971), Jeffrey (1976), and Mahoney and Mahoney (1976).

To increase the knowledge of the behavioral treatments for weight control, further research is suggested. As mentioned previously, a number of procedural and assessment-type problems need to be examined and clarified. Further research of success predictors for potential subjects has been suggested (Balch & Ross, 1975).

Although the need for further research has been indicated, tentative recommendations based on available evidence have been presented. For long-term maintenance and positive results, a full-treatment program is indicated. Initial therapist contact should be gradually faded and supplemented by occasional maintenance sessions. The use of self-control techniques should gradually replace the therapist as the major focus of control. Future investigation may help to

delineate exact treatment plans, length or program, and specific details of fade-out and maintenance. Until these questions are answered, the recommendations posed in this paper may be useful.

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